

WHAT INNOVATION AND TECHNOLOGY TRANSFER REALLY MEAN?

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Aleksandra Bukata

Abstract:

New technologies, innovation, and technology transfer - these are very popular phrases nowadays, especially in terms of the European Union policies of investing in advanced technologies or scientific and industrial collaboration. They are so commonly used that became rather slogans, catchwords than scientific terms. But do we really know what they mean?

Keywords: enterprise, innovations, knowledge-based society, economy competitiveness, management organisation

1. Introduction

Knowledge is considered today as a key factor in building competitiveness and in economical development. Such countries as the United States of America or Japan built their competitive advantage on knowledge - new technologies and innovations. The European Union identified in Lisbon strategy that building knowledge based on economy would enable Europe to reduce the distance to most competitive economies in the world.

Innovations play key role in the knowledge based on economy. There are plenty of innovation definitions. J. A. Schumpeter created first very broad definition. Innovation was when new or improved products (product innovation), new or improved production processes (process innovation), new market, new selling buying procedures (market innovation), new stocks or half products or new production management organisation (management innovation) was implemented [14]. Schumpeter assumed that innovation process is a sequence of actions starting from idea (invention) through materialisation of idea

(innovation) to dissemination. In consequence of such approach the supply innovation theory was defined. In this theory there was an innovation creator on one hand and industry on the other hand. As a result of this approach the concept of research and development sector outside enterprises was created where innovations must be pushed into industry. This model was broadly used in centralised socialistic economies.

Opposite to supply is demand innovation theory, where the market from research sector pulls innovations. J. A. Schmookler is considered as author of this approach. The key role in this model is given to market needs that create inspiration to innovation processes. Recognition of market element in innovation activity leads enterprises to treating innovation policy as strategic development factor and to creation of research and development units within companies. Acknowledgement of market role in innovation process allowed creating very developed network innovation models. Aside from R&D sector and industry such elements as national and local authorities and so-called bridging organisations (technology parks and incubators, consulting companies, technology transfer centres and networks etc.) are taken into consideration. The demand innovation theory resulted in changed definition of innovation. Due to the Oslo Manual innovation is when new or improved product is introduced on the market or new or improved process is implemented in production. However this product or process must be new at least for the implementing enterprise.

Today it is rare that innovation process is being completely conducted within one enterprise. Figure 1 shows the example of factors that influence innovations in enterprises.

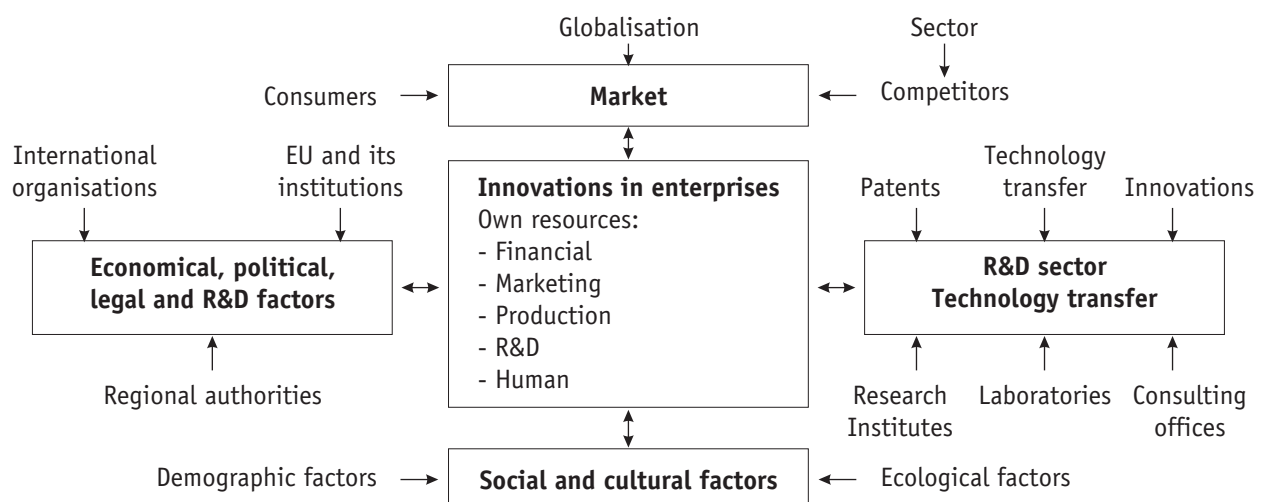


Fig. 1. Factors that influence innovations in enterprises.

Outside innovation factors are especially important for small and medium enterprises. Usually they do not have sufficient resources to individually implement innovations. To survive on highly competitive markets they have to cooperate with other companies and institutions.

Innovations can be divided into two main groups - technological and organisation innovations.

Technological innovations can be implemented into products and services (product innovations) or into new or highly improved production or distribution processes (process innovations). Organisation innovations are such changes in enterprise management and organisation that have positive and measurable influence on revenue. Some analyses also present other types of innovations such as innovations in environment protection or social innovations.

Sources of gaining innovation can be generally divided into:

- internal - related to company's own research and development activities,
- external - related to absorption of technologies developed by other entities,
- mixed or assorted - where both above mentioned sources complement.

Obtaining technologies from internal sources means that research and development activities are run within the organisation. However it requires involving adequate resources and competences from single specialists to whole R&D departments. The most important advantage of internal development of new technologies is their sole, exclusive ownership. But the disadvantages are long-drawn process of new technology evolution (especially comparing to technologies obtained from external sources), costs and risk related to individual technology development and necessity of constant upgrading of technological competences.

Most important advantages and disadvantages of external technology sources are more or less the opposite of internal ones. Therefore advantages are quick access to new technology, relatively lower costs and significant risk reduction. The disadvantages are necessity of adaptation actions and fact that technology is known outside the company. Research centres, universities and companies specialising in developing technologies for commercial purposes may provide external technologies. More broadly also scientific publications, trade marks, internet etc. may be considered as technology suppliers. Figure below shows different technology sources.

Main technology sources in company		
Internal sources	Mixed sources	External sources
- Internal R&D actions - Internal R&D actions for group of companies	- Imitation - Secret take-over of technology/know-how - Obtaining technology from public sources - Ordering R&D actions - Strategic R&D partnership	- Licence agreement - IPR agreement - Joint venture with technology supplier - Company merger with technology take-over

Fig. 2. Main sources of new technologies for enterprises.

Obtaining technology from external or mixed sources is closely related to technology transfer. Technology transfer is usually the basis for technology innovation and often its repercussion.

There are number of technology transfer definitions. Due to the simplest technology transfer is when technology is brought to the market [4, page 81]. Technology transfer can be also considered as intentional, directed knowledge and skill transfer into production process in order to place new product on the market successfully [8, p. 10]. Freeman treats technology transfer as flow of technological knowledge of different kind between legal entities [3, p. 178]. According to other definition “technology transfer mechanism is any specific interaction between two or more social entities during which technology is transferred. The range of technology transfer mechanisms covers all possible forms of interaction during which technology transfer may occur” [1, p. 648].

Technology transfer can take place in every stage of innovation process from initial idea to complete product. It can have local, regional, national, international or

global range. Below mentioned actions can be considered as technology transfer:

- orders for R&D activities made by companies and public sector,
- selling and buying R&D results,
- direct investments, cooperation, joint-ventures and mergers,
- technology market, which means selling and buying - patents, licences, know-how, trade marks, etc.,
- selling and buying machines, appliances, technology lines, modernisation accompanied by trainings of involved personnel as well as technical assistance,
- technology advisory services,
- scientific publications, conferences, seminars, fairs and other kinds of technology information exchange,
- informal contacts with scientists and entrepreneurs resulting in experience exchange,
- work force flow,
- imitation, copying of external technology solutions.

In many countries specified technology transfer models were developed to suit local conditions. Most of those models give special role in technology transfer to SMEs and broker organisations that assist in technology transfer process. Brokerage can vary from general information; through specialised consulting services to financial support of technology transfer itself.

AUTHOR

Aleksandra Bukała - Industrial Research Institute for Automation and Measurements PIAP, Al. Jerozolimskie 202, 02-486 Warsaw, POLAND, tel. +48-22-874-0498, e-mail: abukala@piap.pl.

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